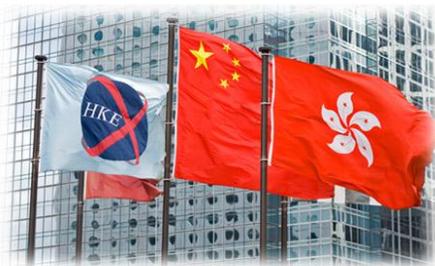




Market Consultation on Volatility Control Mechanism & Closing Auction Session

HKEx Presentation
March 2015



1 Volatility Control Mechanism (VCM)

2 Closing Auction Session (CAS)

The prevalence of algo trading has increased potential systemic risk to the financial market

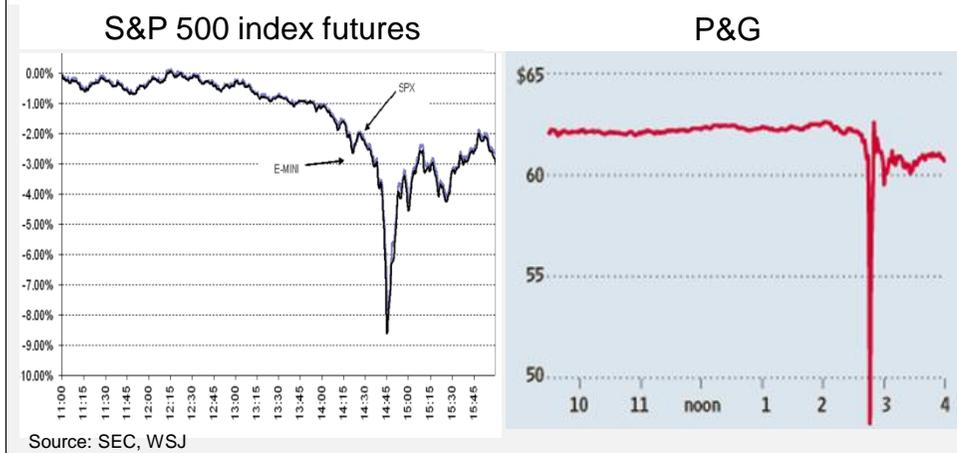
Electronic and automated algorithmic trading are prevalent in Hong Kong and internationally

Trading is faster, average trade size is smaller and the number of trades is increasing

Markets and products become more interconnected, with increased hedging/arbitraging activities

→ Higher potential systemic risks threatening market integrity

Flash Crash in the US market (6 May 2010)



What happened:

- Extreme price fluctuation started in individual instruments...
- ...triggering adverse chain reaction due to interconnectedness of different asset classes and products, causing non-fundamental driven volatility or panic in the market...
- ... individual stock price dropped significantly in a short period of time (e.g. from ~\$40 to \$0.01), and index futures dropped by almost 10%...
- ... leading to a loss in investors' confidence and a series of regulatory and market reviews

**Electronic and algo trading are prevalent in Hong Kong;
do we have adequate measures to safeguard us from such major trading incidents?**

Why review VCM?

G20 & IOSCO*

- Trading venues should have suitable VCM to deal with systemic risks arising from volatile market situations and extreme price movements, particularly with respect to benchmark index products
- The VCM mechanism should provide a temporary cooling-off period to allow market participants to reassess their strategies and reset their algorithm parameters, so as to re-establish an orderly market

SFC

- Support HKEx's review of VCM for safeguarding market integrity
- Discussed with HKEx on suitable VCM models for market consultation

International Practice

- Major US, European and Asian markets have developed VCMs to safeguard market integrity under extreme volatility
- Hong Kong is the only major international market without a VCM

It is HKEx's statutory duty to review VCM for safeguarding market integrity

* Based on: 1). the review called by the G20 in Nov 2010; 2). IOSCO's report on "Regulatory Issues Raised by the Impact of Technological Changes on Market Integrity and Efficiency" published in Oct 2011; and 3). the Joint Report from SEC and CFTC on Flash Crash.

Common VCM models in other international markets

Exchange	VCM Type	Triggering Point	Process & Resumption	Consideration for the HK Market	
US (All regulated exchanges)	Market-level Circuit Breaker	7%, 13% and 20% drop in the S&P 500 Index	Suspend trading for all stocks in all market places for 15 minutes (7%, 13%) or for the whole day (20%)	✗ Significant impact by halting trading of the whole market	
	Stock-level Dynamic Price Limit & Trading Limitation	Type of Stocks	Triggering %	Multiple changes in trading method: 1. Trading within a price limit 2. Trading suspension 3. Auction 4. Back to continuous trading	✗ Model is too complex
		Most liquid stock group > \$3	5%		
		Less liquid stock group > \$3	10%		
		$0.75 \leq \text{stock price} \leq \3	20%		
Stock price < \$0.75	75% or \$0.15				
Note: Rules vary for opening and close					
Europe (LSE, etc.)	Stock-level Trading Limitation	- 2 reference prices (auction price and last trade) - 10 different triggering levels for different securities	Switching from CTS to auction with random end and extensions, before resuming to CTS	✗ Complex model with many triggers and trading suspension in the trading day	
Asia (e.g. Japan, Korea, Taiwan, Mainland)	Stock-level Static Price Limit	A certain % of increase/decrease from previous close	A stock cannot move beyond the limit in a day	✗ Not conducive to price discovery ✗ Difficult to manage overnight risk	
Singapore (SGX)	Stock-level Dynamic Price Limit	10% from last trade 5 minutes ago for stocks > \$0.5	- Allow continuous trading as long as it is within the price limit - Allow multiple triggers	✓ Relative simple model ✓ Recently introduced and well-received by the market	

Which type of VCM would best fit Hong Kong market?

*Note: the above information is compiled based on publicly available sources. Please check with the relevant exchanges for further details or updates as required.

Key considerations in choosing the right model

Key considerations		
IOSCO guidance	Hong Kong market structure	HK market participants' experience

- × Set a daily price limit for trading (e.g. as in some Asia markets, including the Mainland)
- × Halt trading of a large number of instruments, causing excessive market intervention

- ✓ Apply to instruments posing systemic risks only
- ✓ Not to affect normal trading and market risk management
 - ⇒ No suspension but only temporary cooling-off period

A simple and light-touch model is preferred as an important first step

Which securities and derivatives products should be included?

HSI, HSCEI and their index constituent stocks are systemically important and inter-linked

HSI and HSCEI stocks and their respective indexes

Equity Segment	~ 60% ADT from HSI & HSCEI stocks
Structured Products	> 95% ADT from HSI & HSCEI indexes and related stocks
Derivatives Segment	> 90% ADV from HSI & HSCEI related futures and options

Proposed VCM Instruments

Market	Applicable Instruments
Securities	HSI & HSCEI constituent stocks (currently with 81 stocks)
Derivatives	Index futures contracts with HSI or HSCEI as their underlying index (i.e. Including HSI, HHI, MHI and MCH spot month & next calendar month contracts, currently with 8 future contracts)

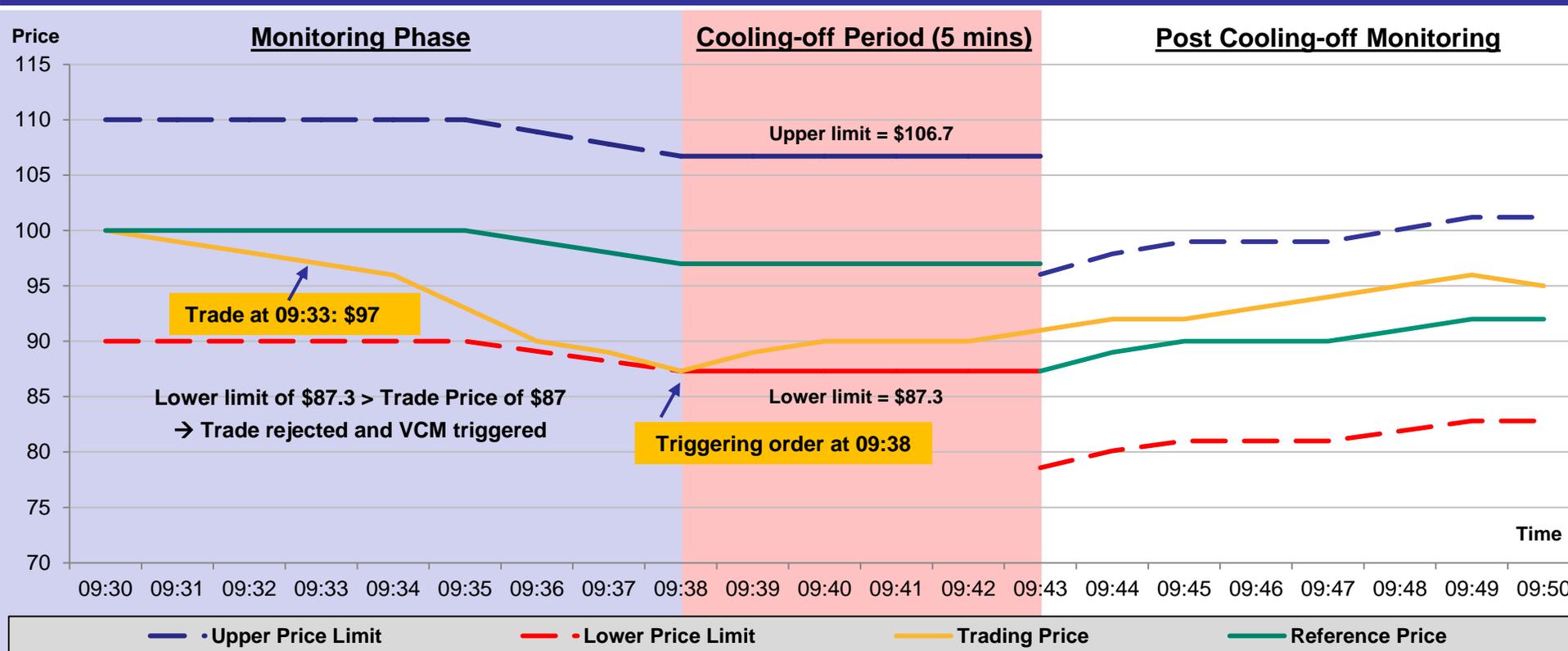
Focus on instruments with potential systemic risks → HSI & HSCEI related instruments

Our proposed VCM model design

Triggering Point

- **Triggering level:** $\pm 10\%$ from the reference price for securities market
 $\pm 5\%$ from the reference price for derivatives market
- **Reference price:** Last trade 5 minutes ago

Illustrative example by using the trading of an applicable VCM stock during CTS (excluding last 15 minutes*)



* Since a VCM trigger will last for 5 minutes, the monitoring will stop 20 minutes before end of continuous trading session (CTS).

Monitoring Phase

- Reference to a dynamic price (last trade 5-minute ago) to capture rapid and large price movements
- Monitoring stops in the last 20 minutes of the Afternoon Session to avoid causing overnight risk
- Maximum of two triggers in each trading session for each instrument (i.e. 2 in the Morning Session and 2 in the Afternoon Session) to minimize market interruption

Cooling-off Period

- The cooling-off period would last for 5 minutes, and trading would resume to normal afterwards*
- The triggered instrument would only be allowed to trade within price limit
- No cooling-off period in the last 15 minutes in the Afternoon Session

*If there is no trading within cooling-off period, the following first trade would not be subject to price limitation and will become the reference price.

Applicable period for VCM#

		Securities Market		Derivatives Market					
		Period	VCM Applicable?^	First Reference Price	Period	VCM Applicable?^	First Reference Price		
Securities Market	Period	09:00-09:30 POS	09:30-12:00 Morning Session	Lunch Break			13:00-15:45 Afternoon Session	15:45-16:00	16:00-16:12 CAS
	VCM Applicable?^	x	✓				✓	x	x
First Reference Price			POS Trade Price*		First Trade Price in the Afternoon Session				
Derivatives Market	Period	08:45-09:15 POS	09:15-12:00 Morning Session	12:30-13:00 POS	13:00-16:00 Afternoon Session		16:00-16:15		
	VCM Applicable?^	x	✓	x	✓	x			
First Reference Price			Calculated Opening Price*		Calculated Opening Price*				

Auction Session
 Continuous Trading Session

POS = Pre-opening session in the securities market or Pre-Market Opening Period in the derivatives market

#Time shown above is not drawn to scale.

^VCM is applicable to half trading days as well and it would stop monitoring in the last 20 minutes of the CTS.

*If there is no trading in the POS, the following first trade will become the first reference price.

VCM Case studies



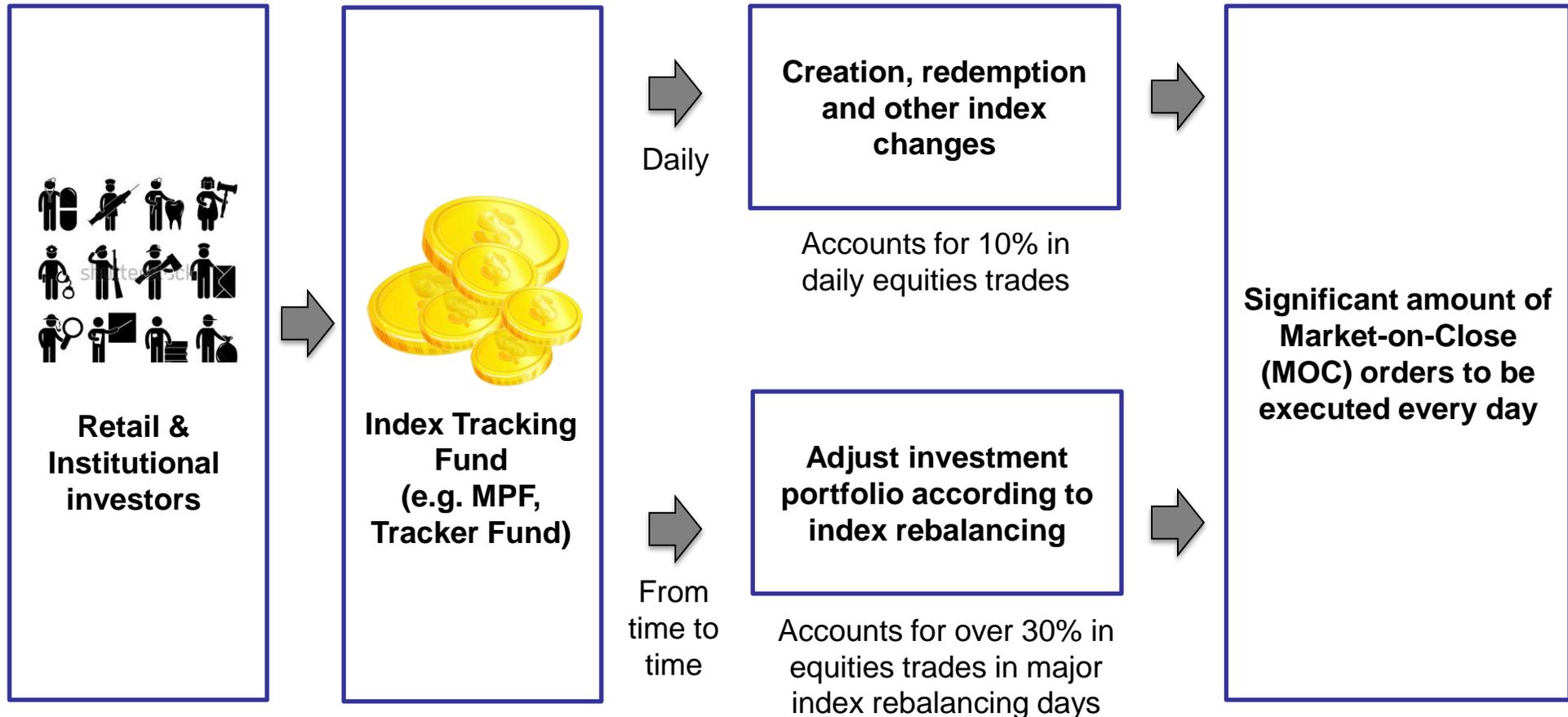
#	Case	Trigger?	#	Case	Trigger?
1	Large price movement at the start of the Morning Session (Case A) <i>Can absorb overnight news</i>	✗	7	Trading suspended in the Morning Session, and resumed in the Afternoon Session <i>Can absorb PSI news from trading suspension</i>	✗
2	Large price movement within a short period of time at the start of the Morning Session (Case B) <i>Cooling-off only triggered when there is extreme price movement within a short span of time</i>	✓	8	Large price movement within a short period of time at the end of the Morning Session <i>VCM applicable at the end of the Morning Session</i>	✓
3	Large price movement of the first trade in the Afternoon Session (Case A) <i>Can absorb market news during lunch break</i>	✗	9	Large price movement within a short period of time at the end of the Afternoon Session <i>VCM not applicable for the last 15 minutes of the last CTS</i>	✗
4	Large price movements within a short period of time at the start of the Afternoon Session (Case B) <i>Cooling-off only triggered when there is extreme price movement within a short span of time</i>	✓	10	Half-day trading: Large price movements within a short period of time at the end of the Morning Session <i>VCM not applicable at the end of 15 minutes of the Morning Session for half trading days</i>	✗
5	Multiple large price movements within a short period of time during the Afternoon Session <i>Maximum of 2 triggers per session</i>	✓	11	No trading in the cooling-off period <i>After the cooling-off period, first trade can be executed without any price limit applied</i>	
6	Large price movements within a short period of time in a mega IPO <i>IPO price movement not affected by VCM</i>	✗			

Remarks: Please refer to Appendix 1 for detailed illustration of the cases respectively

1 Volatility Control Mechanism (VCM)

2 Closing Auction Session (CAS)

Why some market participants need to execute trades at the closing price?



These funds are mandated to execute trades at the closing price (i.e. MOC order)

Possible consequence of not able to execute trades at the closing price



- Lead to larger index tracking error which would impact the performance of investment funds and the cost would ultimately be borne by end investors (e.g. MPF holders)
- May result in increased trading cost due to execution inefficiency
- Orders not completed may be executed off the exchange so that other brokers/investors may not participate in the trade
- Lead to overnight risks if trades cannot be completed within the day
- Some investors may participate less in the Hong Kong market since it is difficult to execute orders at closing price, which would adversely impact the competitiveness of Hong Kong market

Current closing mechanism cannot meet market needs of execution at closing price



Current closing mechanism – Taking the median of 5 nominal prices in the last minute of the CTS as the closing price

Illustration:

Snapshot	Time	Bid Price	Ask Price	Last Recorded Price	Nominal Price
1.	3:59:00 p.m.	\$39.40	\$39.50	\$39.50	\$39.50
2.	3:59:15 p.m.	\$39.40	\$39.50	\$39.50	\$39.50
3.	3:59:30 p.m.	\$39.30	\$39.40	\$39.50	\$39.40
4.	3:59:45 p.m.	\$39.30	\$39.40	\$39.40	\$39.40
5.	4:00:00 p.m.	\$39.20	\$39.30	\$39.30	\$39.30

Median price = \$39.40
as closing price

Only less than 1% of trades are executed within these 5 seconds,
and the execution price is not guaranteed

Why not enhance the current closing mechanism?

Some market participants' suggestions on the enhancement

Take more nominal prices to calculate the closing price

Use Volume Weighted Average Price (VWAP)

Reference to the settlement price calculation methodology for futures index (i.e. EAS)

Introduce additional session for matching in accordance to the closing price

Issues

Closing price determination is not the root issue. As trading would have stopped after closing price is calculated, market participants would not be able to subsequently execute at this closing price.

According to other markets' experience, liquidity is usually thin for additional trading at the closing price after it has been determined, hence cannot satisfy market needs

All developed markets except Hong Kong and most emerging markets have CAS



All Developed Markets* except Hong Kong have CAS

With CAS (22):

- | | |
|-------------|---------------|
| ✓ Australia | ✓ Japan |
| ✓ Austria | ✓ Netherlands |
| ✓ Belgium | ✓ New Zealand |
| ✓ Canada | ✓ Norway |
| ✓ Denmark | ✓ Portugal |
| ✓ Finland | ✓ Singapore |
| ✓ France | ✓ Spain |
| ✓ Germany | ✓ Sweden |
| ✓ Ireland | ✓ Switzerland |
| ✓ Israel | ✓ UK |
| ✓ Italy | ✓ US |

Without CAS (1):

- × Hong Kong

Most Emerging Markets* have CAS

With CAS (20):

- | | |
|-------------------|----------------|
| ✓ Brazil | ✓ Peru |
| ✓ Colombia | ✓ Philippines |
| ✓ Czech Republic | ✓ Poland |
| ✓ Greece | ✓ Qatar |
| ✓ Hungary | ✓ Russia |
| ✓ Indonesia | ✓ South Africa |
| ✓ Korea | ✓ Taiwan |
| ✓ Mainland (SZSE) | ✓ Thailand |
| ✓ Malaysia | ✓ Turkey |
| ✓ Mexico | ✓ UAE |

Without CAS (4):

- | | |
|------------------|---------|
| × Chile | × Egypt |
| × Mainland (SSE) | × India |

Without CAS, Hong Kong's competitiveness as an international finance centre is hampered

* Based on MSCI classification.

CAS was introduced in May 2008 but was suspended 10 months later



Introduction of the Previous CAS	Date	Events
	Jul 2007	<ul style="list-style-type: none"> Introduced CAS based on positive consultation results Closing auction model followed Pre-opening Session based on market feedback
	26 May 2008	<ul style="list-style-type: none"> CAS launched

Suspension of the Previous CAS	Date	Events
	30 May 2008	<ul style="list-style-type: none"> 5 days after launch, 21 stocks moved >5% in the CAS on the day of MSCI rebalancing
	Feb 2009	<ul style="list-style-type: none"> Consulted and concluded that a 2% price limit should be added to the CAS as the only price control measure (not implemented)
	9 Mar 2009	<ul style="list-style-type: none"> HSBC stock price plunged 11% in the last few seconds of the CAS
	23 Mar 2009	<ul style="list-style-type: none"> CAS suspended before the proposed price limit was implemented
May 2013	<ul style="list-style-type: none"> The trader who was suspected of causing the HSBC incident was not reprimanded* 	

The previous CAS was suspended due to price instability

* See <http://www.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/doc?refNo=13PR51>

Major concerns	8 new measures in the proposed CAS
1. Large price movement in CAS	<ul style="list-style-type: none">• Introduce a new and enhanced CAS including 4 new measures with reference to other markets' experiences and issues in the previous CAS (see more details in the next page)
2. Extreme priced orders hidden in the order book	
3. Potential gaming of fixed closing time by some market participants	
4. At-auction limit orders are not allowed near the end of CAS	
5. Retail investors may not participate as much in CAS due to lack of understanding of the mechanism	<ul style="list-style-type: none">• Strengthen market education
6. Trading in CAS may be subject to manipulation	<ul style="list-style-type: none">• Enhance market surveillance system to monitor and detect any irregular market activity
7. The market may not be comfortable with rolling out CAS to all securities in a single phase	<ul style="list-style-type: none">• Rollout in two phases
8. Inadequate preparation time	<ul style="list-style-type: none">• Allow adequate time for preparation

Four new measures to address price volatility issue



Time	9:30-12:00; 13:00-16:00	16:00	16:01	16:08	16:10	16:12
Session	Continuous Trading Session (CTS)	Closing Auction Session				
Description	Reference price based on the median of 5-snapshot nominal prices in the last minute of CTS	Blocking Period (1 min)	Order Input Period (7 mins)	No-cancellation Period (2 mins)	Random Closing Period (2 mins)	
		<ul style="list-style-type: none"> Calculate & publish reference price No Input, Cancel & Amend Orders within price limit will be automatically carried forward 	Price Limit: a 5% of Reference Price	b Within lowest ask & highest bid		
			Order Type Allowed: At-auction Limit Order	At-auction Order		At-auction Limit Order
			Order Input, Cancellation & Amendment: Allowed Input, Cancel & Amend	Input Allowed, Cancel & Amend Not Allowed		

Other New Measures:

- Better transparency by showing the IEP price limit, the 16:00 CTS closing and imbalance information (direction and quantity)
- Allow short selling orders subject to a tick rule (reference price)
- Allow matching of at-auction orders at the reference price when an auction price cannot be determined

Note: The day close of Stock Index Futures and Options in the derivatives market would be extended for 15 minutes, same as the previous CAS. To allow sufficient time for the market to prepare for AHFT's opening, which is 45 minutes after day close, the opening time of AHFT may be changed from 17:00 to 17:15, subject to the consultation feedback.

Four new features of new CAS

Features	Descriptions	Rationale
1. Price Limit	<ul style="list-style-type: none"> 1st stage: $\pm 5\%$ 2nd stage: between lowest ask and highest bid 	<ul style="list-style-type: none"> Prevent extreme priced orders to be input to system 2-stage to allow a smooth price formation process The reference price is based on the existing closing price calculation approach Second stage can further reduce price volatility near the end of CAS
2. Random Closing	<ul style="list-style-type: none"> Auction matching ends randomly within the 2-minute period of 16:10 to 16:12, exact ending of the CAS determined randomly by the system 	<ul style="list-style-type: none"> Deter gaming concerning closing time Encourage earlier input of orders
3. Auction Transparency	<ul style="list-style-type: none"> Showing the reference price (CTS closing price), upper and lower price limit, and imbalance information 	<ul style="list-style-type: none"> Address previous CAS issue – better transparency of price information Market can know the IEP range Facilitate price discovery and trading
4. At-auction Limit Orders	<ul style="list-style-type: none"> All investors can input At-auction Limit orders throughout the CAS 	<ul style="list-style-type: none"> Provide price protection as well as price improvement opportunity To attract more market participants to participate

Note: See Appendix 2 for international comparison of closing auction features.

Phased rollout to different securities to ensure a smooth rollout



Phase	Phase I Securities: Index Constituent Stocks <i>(subject to consultation feedback)</i>	Phase II Securities: Other Stocks <i>(subject to Phase I result and market feedback)</i>
Scope	<p>A. Major index constituents (~280 stocks)</p> <ul style="list-style-type: none">▪ Stocks including:<ul style="list-style-type: none">– Constituent stocks of Hang Seng Composite LargeCap and MidCap indexes– Other Stock Connect stocks▪ Covers most equities and almost all major index constituents <p>B. ETFs that track Hong Kong stocks (~40 ETFs)</p>	<p>C. Include remaining ~1,500 stocks, ETFs and REITs plus some other equity products</p> <ul style="list-style-type: none">▪ Covers all equities and funds▪ Excludes structured products and debt securities

Concluding remarks of the new CAS

Orderly auction process	Fair trading	Adequate market preparation
<ol style="list-style-type: none">1. Two-stage price limits to ensure no extreme volatility in closing price2. Adopt random closing to increase the cost of gaming at the end of CAS <ul style="list-style-type: none">• <i>Disallow order amendment and cancellation at the end of CAS to prevent large price movements</i>	<ol style="list-style-type: none">3. Allow At-auction limit order throughout the CAS to satisfy investors' needs4. Transparent information to facilitate balanced participation for all types of investors5. Enhance market surveillance system for monitoring and detecting irregular trading activities	<ol style="list-style-type: none">6. Allow at least 1 year for market participants to prepare for the rollout7. Phased rollout (First phase: index constituent stocks, Stock Connect stocks and related ETFs; Second phase: other stocks)8. Strengthen market education to ensure that new CAS model is well understood by market participants

16 January 2015 – Issuance of Consultation Paper

<http://www.hkex.com.hk/eng/newsconsul/mktconsul/marketconsultation.htm>

Then a 12-week Consultation Period

10 April 2015 – Deadline for Responses to Consultation

response@hkex.com.hk

Any Questions?



Appendices

Appendix 1

Case studies - overview



#	Case
1	Large price movement at the start of the Morning Session (Case A)
2	Large price movement within a short period of time at the start of the Morning Session (Case B)
3	Large price movement of the first trade in the Afternoon Session (Case A)
4	Large price movements within a short period of time at the start of the Afternoon Session (Case B)
5	Multiple large price movements within a short period of time during the Afternoon Session
6	Large price movements within a short period of time in a mega IPO

#	Case
7	Trading suspended in the Morning Session, and resumed in the Afternoon Session
8	Large price movement within a short period of time at the end of the Morning Session
9	Large price movement within a short period of time at the end of the Afternoon Session
10	Half-day trading: Large price movements within a short period of time at the end of the Morning Session
11	No trading in the cooling-off period

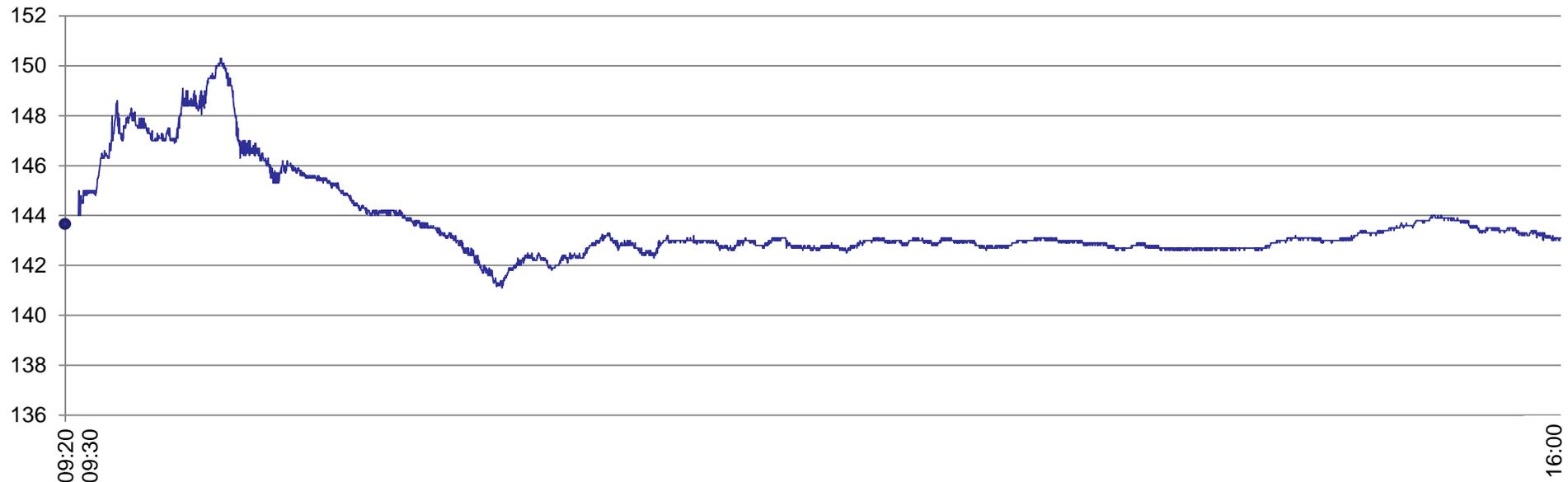
Appendix 1: VCM Example

1. Large price movement at the start of the Morning Session (Case A)



- Previous closing price: \$124.8
- POS price: \$143.5 (↑15%)
- First trade price in the Morning Session: \$144.0 (↑0.3% vs POS price)
- Stock trades between \$141.1 – \$150.3 afterwards

Result:
No trigger of the cooling-off period



VCM allows investors to absorb overnight market news, as the formation of the POS price (the first reference price of the day) is not affected by the previous closing

Appendix 1: VCM Example

2. Large price movement within a short period of time at the start of the Morning Session (Case B)



- Previous closing price: \$28.25
- POS price: \$25.00 (↓11.5%) (becomes the reference price for first 5 minutes after market open)
- At 09:30, stock price drops below \$22.50 (lower limit) in a few seconds

Result:
One trigger of the cooling-off period after market open



On the contrary, the cooling-off period would be triggered only when large price movement happens within a short span of time in the Morning Session

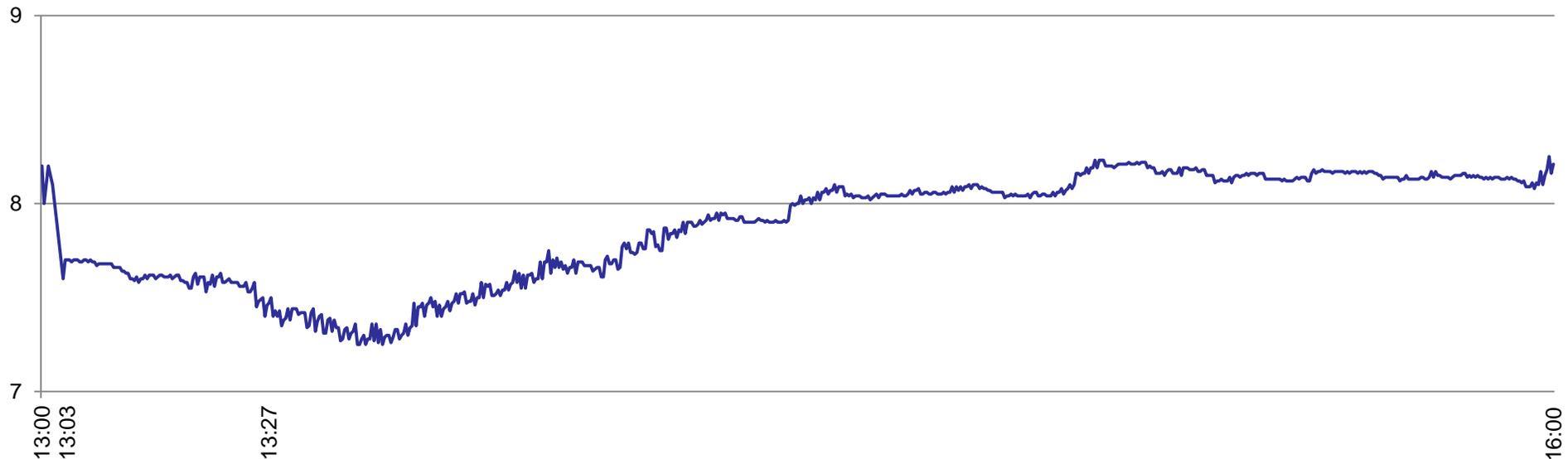
Appendix 1: VCM Example

3. Large price movement of the first trade in the Afternoon Session (Case A)



- Morning session closing price: \$12.00
- First trade price in the Afternoon Session: \$8.20 (↓31.7% vs last closing price) becomes the reference price for first 5 minutes after opening
- At 13:03, it drops to \$7.60 (↓7.3% vs Afternoon Session opening price). At 13:27 it drops to \$7.35 (↓10.4% vs Afternoon Session opening price), yet stock price movement is less than 10% within 5 minutes

Result:
Won't trigger cooling-off period



VCM allows reaction to market news during lunch break, as the first trade price in the afternoon won't be monitored by VCM and will be the first reference price

Appendix 1: VCM Example

4. Large price movements within a short period of time at the start of the Afternoon Session (Case B)

- First trade price in the Afternoon Session: \$8.20 (becomes the reference price for the first 5 minutes after opening)
- At 13:04, potential trade price: \$7.36 ($\downarrow > 10\%$), triggers cooling-off period

Result:
One trigger of the cooling-off period after afternoon open



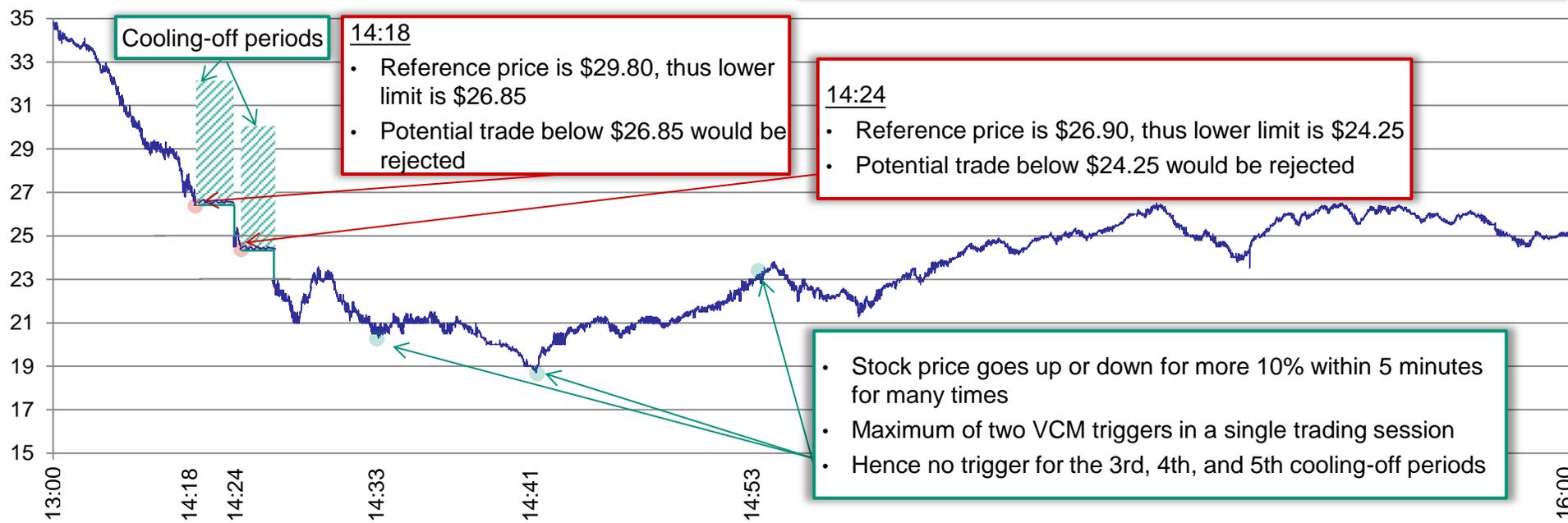
Contrast with the previous case, cooling-off period will be triggered only when large price movement happens in a short period of time in the Afternoon Session

Appendix 1: VCM Example

5. Multiple large price movements within a short period of time during the Afternoon Session

- First trade price in the Afternoon Session: \$34.90
- At 14:18, potential trade price: \$26.70 ($\downarrow > 10\%$ vs trade price 5 minutes ago), triggers cooling-off period
- At 14:24, potential trade price: \$24.10 ($\downarrow > 10\%$ vs trade price 5 minutes ago), triggers cooling-off period
- Afterward there are multiple times that the stock price goes up or down for more than 10% within 5 minutes

Result:
Two triggers of the cooling-off periods in the Afternoon Session



**Maximum of two VCM triggers in a single trading session
(for both the Morning and Afternoon Session)**

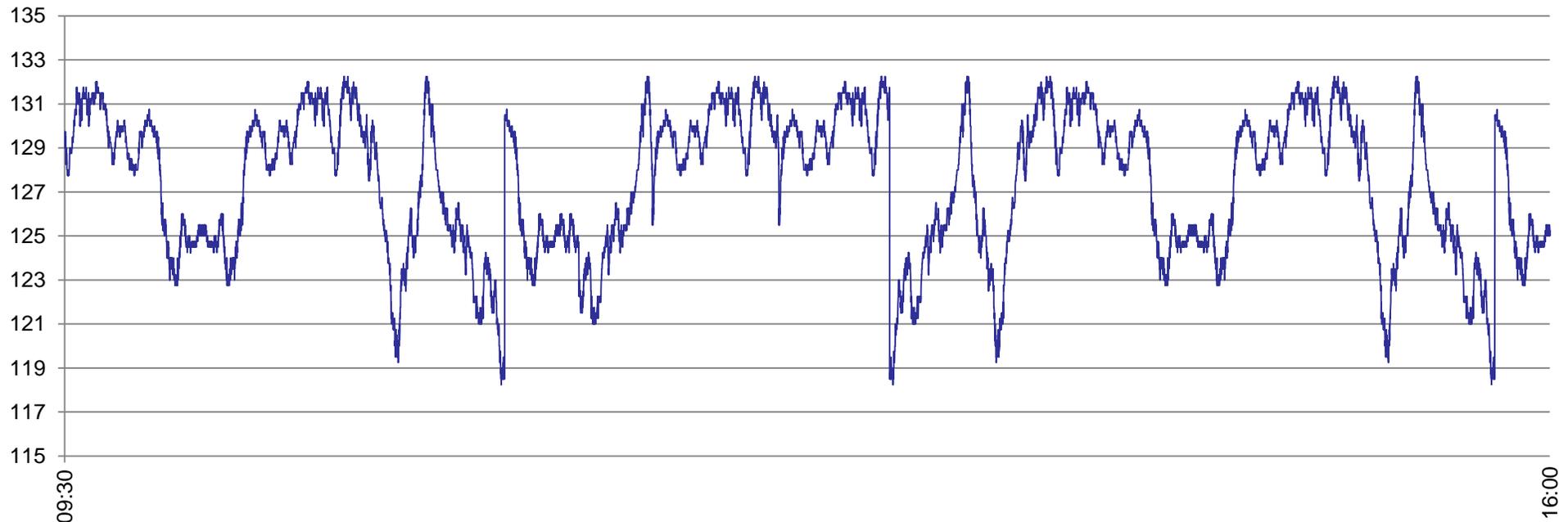
Appendix 1: VCM Example

6. Large price movements within a short period of time in a mega IPO



- Large price movements for Mega IPO stock listing on the first day
- Stock price goes up and down for more than 10% within 5 minutes multiple times
- Since it is not one of the 81 HSI/HSCEI constituent stocks, VCM is not applicable

**Result:
Won't trigger cooling-off period**



VCM is applicable to the 81 HSI/HSCEI constituent stocks only

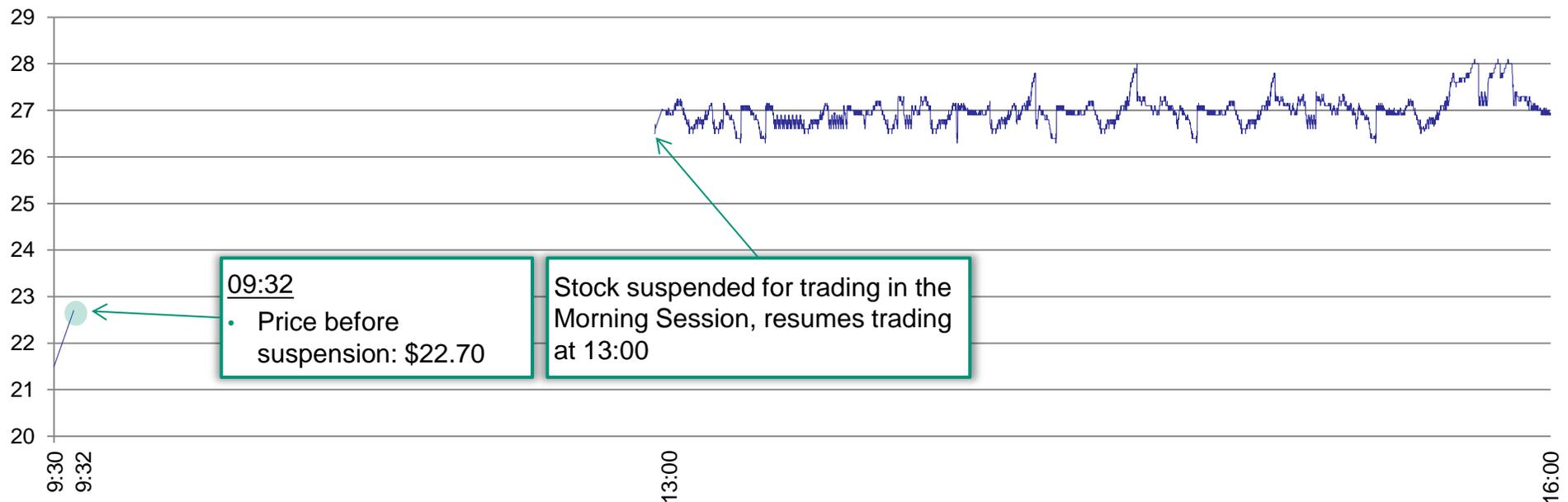
Appendix 1: VCM Example

7. Trading suspended in the Morning Session, and resumed in the Afternoon Session



- Price before suspension: \$22.70, stock trading suspended at 09:32
- Stock suspended for trading for rest of the Morning Session
- First trade price in the Afternoon Session: \$26.50 (↑16.7%), stock trades between \$26.25 – \$28.05 afterwards
- First trade price becomes the reference price for the first 5 minutes

Result:
Won't trigger cooling-off period



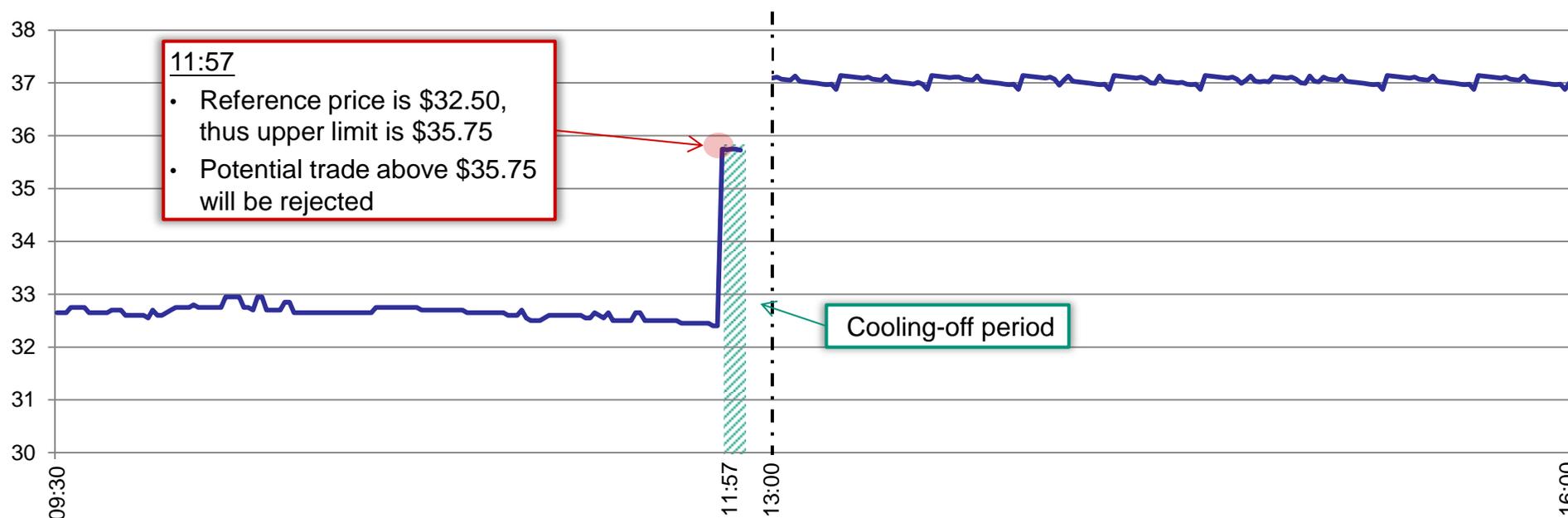
If a stock is suspended for trading in the Morning Session, first trade price after resumption in the Afternoon Session will be the reference price for the first 5 minutes

Appendix 1: VCM Example

8. Large price movement within a short period of time at the end of the Morning Session

- Entire Morning Session is monitored by VCM
- At 11:57, order price is \$36.00 (↑10.8% vs trade price 5 minutes ago), triggers cooling-off period
- \$37.10 as the first trade price in the Afternoon Session becomes the reference price for the first 5 minutes in the Afternoon Session; which is unrelated to the Morning Session (cooling-off period in the Morning Session won't carry over to the Afternoon Session)

Result:
One trigger of the cooling-off period near the end of Morning Session



Cooling-off period in the Morning Session won't carry over to the Afternoon Session

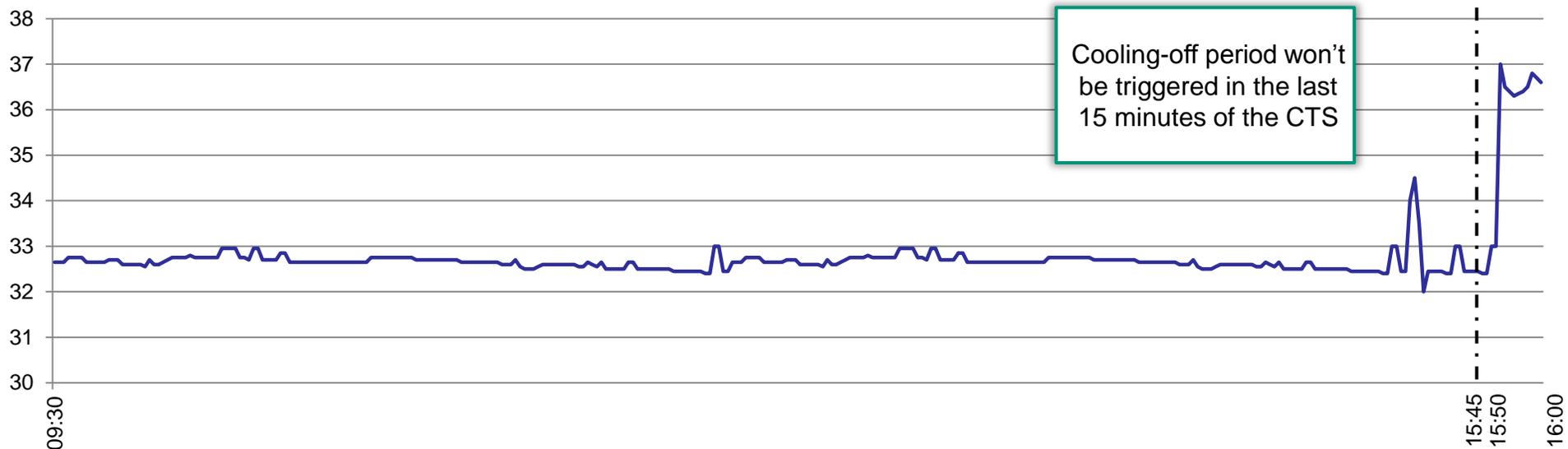
Appendix 1: VCM Example

9. Large price movement within a short period of time at the end of the Afternoon Session



- At 15:50, trade price: \$37.00 (↑12.1% vs 5 minutes ago)
- Cooling-off period is not applicable for the last 15 minutes of the CTS, thus trade price at 15:50 won't trigger cooling-off period

Result:
Won't trigger cooling-off period



Cooling-off period won't be triggered in the last 15 minutes of the CTS to allow for efficient price discovery at market close and to avoid investors being potentially prevented from closing out their positions and being forced to take overnight risks

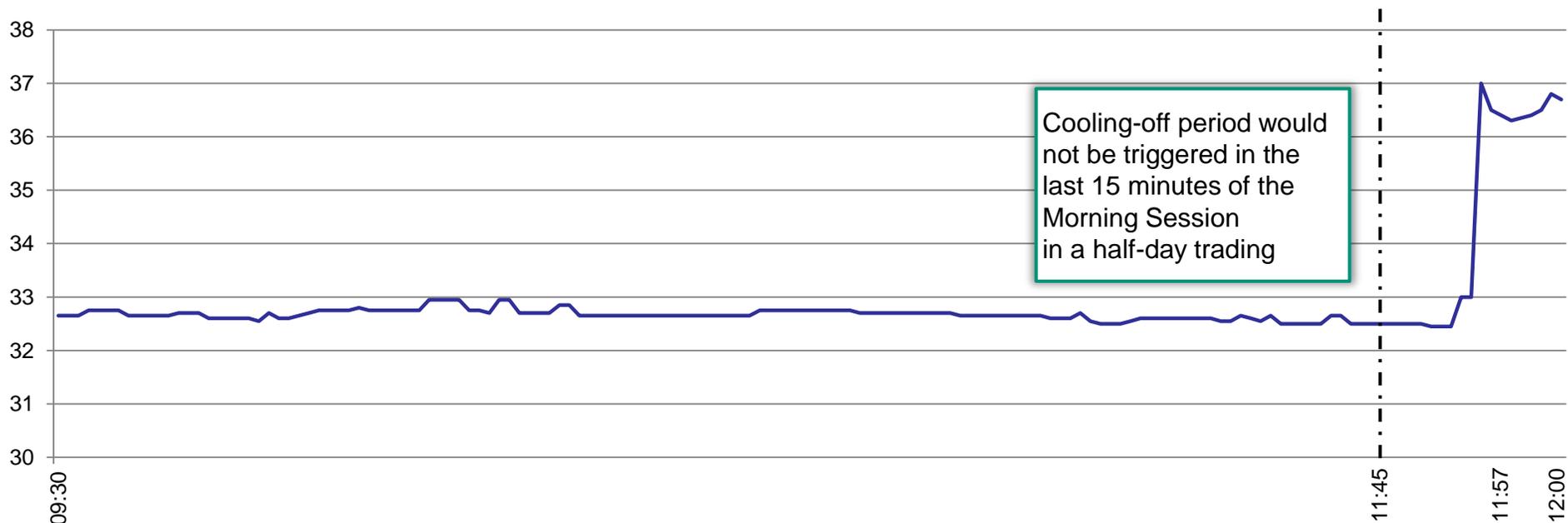
Appendix 1: VCM Example

10. Half-day trading: Large price movements within a short period of time at the end of the Morning Session



- At 11:57, trade price: \$37.00 (↑12.1% vs 5 minutes ago)
- The last 15 minutes of the Morning Session in a half-day trading would not trigger cooling-off period

Result:
Won't trigger cooling-off period



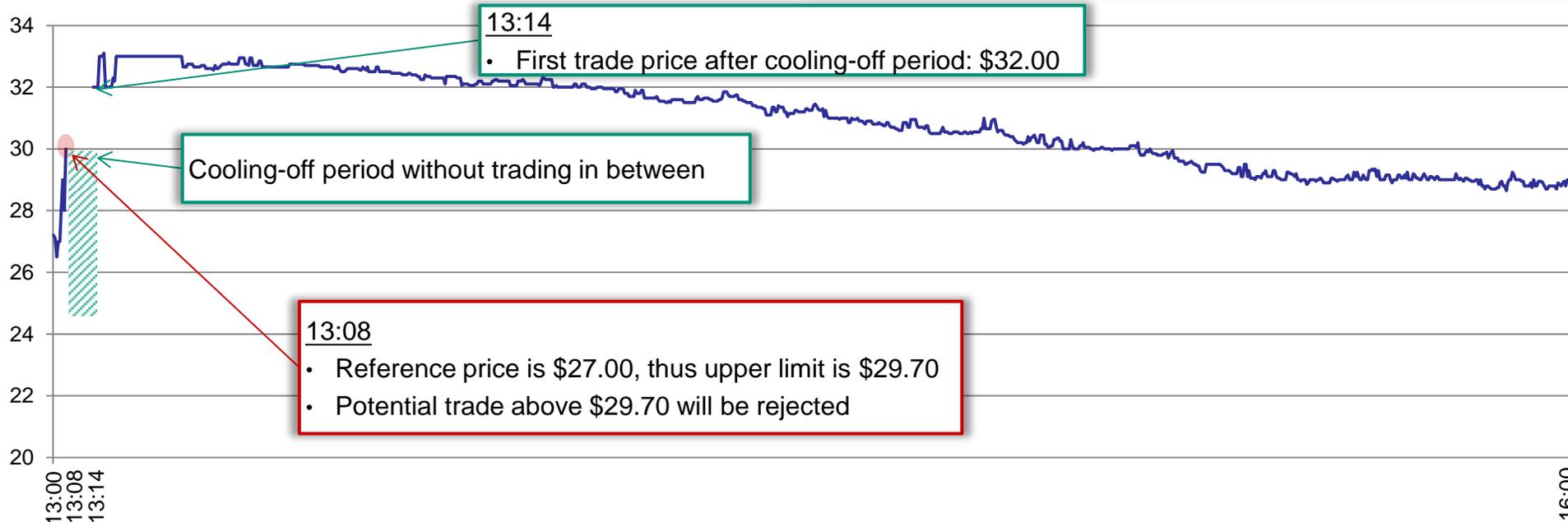
Following the previous case, same logic applies to half-day trading

Appendix 1: VCM Example

11. No trading in the cooling-off period

- At 13:03, trade price: \$27.00
- At 13:08, potential trade order: \$30.00
($\uparrow 11.1\%$ vs 5 minutes ago, triggers cooling-off period)
- There is no trading in the cooling-off period
- VCM would not be applicable to the first trade after
- First trade price after cooling-off period: \$32.00

Result:
If there is no trading in the cooling-off period, the first trade can be executed without any price limit applied



If there is no trading in the cooling-off period, VCM is not applicable to the first trade after cooling-off period

Appendix 2: International CAS comparison

Features used by other major exchanges to address price instability



Features to Address Price Instability Issue					
Exchange	Price limit	At-auction limit orders throughout CAS	Random closing	No cancellation near the end of CAS	Auction extension upon price breach
HKEx (Hong Kong)	✓ NEW (5% from last CTS; then within best bid/ask) For volatility control	✓ NEW Better price discovery by allowing offsetting flows	✓ NEW Prevent gaming of closing time	✓ From Previous CAS Prevent last minute order withdrawal	✗ NOT Proposed Already have price limit which is more stringent; complicated design
NYSE/NASDAQ (US)	✓	✓	✗	✓	✗
LSE/DB (UK/Germany)	✗*	✓	✓	✗	✓
Euronext (Paris)	✗	✓	✗	✗	✓
SGX (Singapore)	✗	✓	✓	✓	✗
KRX (Korea)	✓	✓	✓	✗	✓
TSE (Japan)	✓	✓	✗	✗	✗
ASX (Australia)	✗	✓	✓	✗	✗
TWSE (Taiwan)	✓	✓	✗	✗	✓
SZSE (Mainland)	✓	✓	✗	✓	✗

Propose to adopt all features except auction extension to address the price instability issue

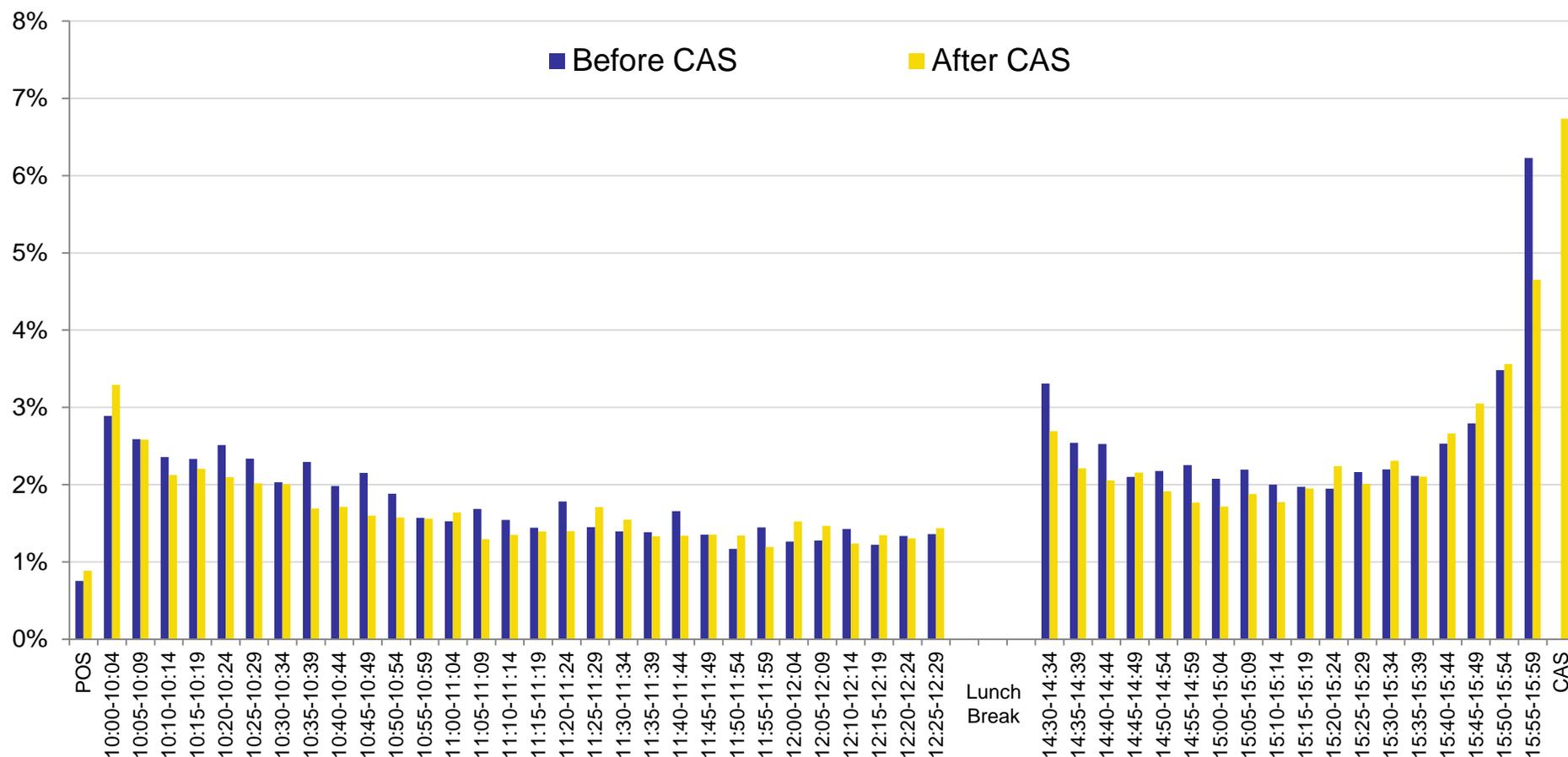
* Price limit varies according to the security price, i.e. the smaller the price, the larger the percentage limit.

Note: the above table is compiled on publicly available information. Please refer to the relevant exchanges for more details or further updates.

Appendix 3: Comparison of intra-day turnover distribution as observed from the previous CAS



Intra-day Turnover Distribution – Before and After CAS*



*Based on trading statistics during the initial period before and after launch of the previous CAS.

Appendix 4: Examples of price limit in CAS

First Stage

16:01–16:08

16:00 Price

Reference Price = \$100

Price Limit = \$95 to \$105

16:08 Price

Best (highest) Bid Price = \$103

Best (lowest) Ask Price = \$101

IEP is formed in the first stage

Second Stage

16:08–16:12

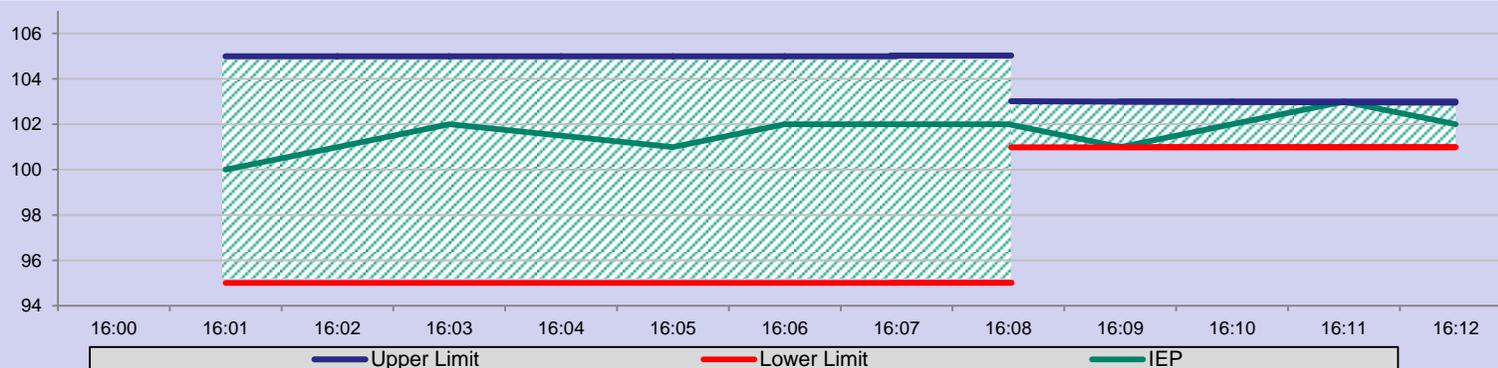
16:08 Price

IEP = \$102

At-Auction limit order price limit = \$101 to \$103

IEP price range maintains between \$101 - \$103 since no cancellation and amendments of orders after

Illustration



Note: Taking the median of 5 nominal prices in the last minute of the CTS to be the reference price, bid/ask orders cannot deviate more than 5% from the reference price in first stage.